Report Information from Dialog DataStar

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Feature association and occlusion model estimation for synthetic aperture radar.

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Conference information
Algorithms for Synthetic Aperture Radar Imagery XI, Orlando, FL, USA,
12–15 April 2004.

Source
Proceedings of the SPIE – The International Society for Optical Engineering,
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Abstract
We develop a radar–based automatic target recognition approach for partially occluded objects. The approach may be variously posed as an optimization problem in the phase history, scene reflectivity and feature domains. The latter consists of point scattering features estimated from the phase histories or corresponding images. We adopt simple **occlusion** models in which the physical scattering responses (isotropic scattering centers, attributed scatterers. etc.) can be occluded in any combination. The formulation supports the use of prior **occlusion** models (e.g., that **occlusion** is spatially correlated rather than randomly distributed). We introduce a physics–based noise **covariance** model for use in cost or objective functions. **Occlusion** model estimation is a combinatorial problem since the optimal subset of scatterers must be discovered from a potentially much larger set. Further, the number of occluded scatterers must be estimated as a part of the solution. We apply a genetic algorithm to solve the combinatorial problem, and we provide a simple demonstration example using synthetic data.

Descriptors
GENETIC–ALGORITHMS; HIDDEN–FEATURE–REMOVAL; NOISE; OBJECT–RECOGNITION;
RADAR–IMAGING; SCATTERING; SYNTHETIC–APERTURE–RADAR.

Classification codes
B6320 Radar–equipment–systems–and–applications*;
B6135 Optical–image–and–video–signal–processing;
B0260 Optimisation–techniques.

Keywords
feature–association; **occlusion–**model–estimation; synthetic–aperture–
radar; radar–based–automatic–target–recognition–approach; scattering–
features–estimation; **occlusion–**model; **physics–**based–noise–covariance–
model; occluded–scatterer; genetic–algorithm; synthetic–data.

Treatment codes
P Practical;
T Theoretical–or–mathematical.

Language
English.

Publication type
Conference–paper; Journal–paper.

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Moving object detection using region tracking.

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Artificial Life and Robotics, {Artif–Life–Robot–Japan}, 2004, vol. 8, no. 1, p. 20–8, 19 refs, ISSN: 1433–5298. Publisher: Springer–Verlag, Japan.

Author(s)

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Abstract

For many vision–based systems, it is important to detect a moving object automatically. The region–based motion estimation method is popular for automatic moving object detection. The region–based method has several advantages in that it is robust to noise and variations in illumination. However, there is a critical problem in that there exists an **occlusion** problem which is caused by the movement of the object. The **occlusion** problem results in an incorrect motion estimation and faulty detection of moving objects. When there are **occlusion** regions, the motion vector is not correctly estimated. That is, a stationary background in the occluded region can be classified as a moving object. In order to overcome this **occlusion** problem, a new **occlusion** detection algorithm is proposed. The proposed **occlusion** detection algorithm is motivated by the assumption that the distribution of the error histogram of the **occlusion** region is different from that of the nonocclusion region. The proposed algorithm uses the mean and **variance** values to decide whether an **occlusion** has occurred in the region. Therefore, the proposed **occlusion** detection and motion estimation scheme detects the moving regions and estimates the new motion vector, while avoiding misdetection caused by the **occlusion** problem. The experimental results for several video sequences demonstrate the robustness of the proposed approach to the **occlusion** problem.

Descriptors

IMAGE–SEQUENCES; MOTION–ESTIMATION; OBJECT–DETECTION; VIDEO–SIGNAL–PROCESSING.

Classification codes

B6135 Optical–image–and–video–signal–processing*;
C5260D Video–signal–processing*;
C5260B Computer–vision–and–image–processing–techniques.

Keywords

automatic–moving–object–detection; region–tracking; vision–based–systems; region–based–motion–estimation–method; incorrect–motion–estimation; faulty–detection; **occlusion–**detection–algorithm; error–histogram; motion–vector–estimation; video–sequences; nonocclusion–region; **occlusion–**region; **occlusion–**problem.

Treatment codes

T Theoretical–or–mathematical;
X Experimental.

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Visual tracking and recognition using appearance–adaptive models in particle filters.

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IEEE Transactions on Image Processing, {IEEE–Trans–Image–Process–USA}, Nov. 2004, vol. 13, no. 11, p. 1491–506, 37 refs, CODEN: IIPRE4, ISSN: 1057–7149. Publisher: IEEE, USA.
Author(s)
Shaohua–Kevin–Zhou, Chellappa–R, Moghaddam–B.
Author affiliation
Shaohua Kevin Zhou, Integrated Data Syst. Dept., Siemens Corp. Res., Princeton, NJ, USA.
Abstract
We present an approach that incorporates appearance–adaptive models in a particle filter to realize robust visual tracking and recognition algorithms. Tracking needs modeling interframe motion and appearance changes, whereas recognition needs modeling appearance changes between frames and gallery images. In conventional tracking algorithms, the appearance model is either fixed or rapidly changing, and the motion model is simply a random walk with fixed noise **variance.** Also, the number of particles is typically fixed. All these factors make the visual tracker unstable. To stabilize the tracker, we propose the following modifications: an observation model arising from an adaptive appearance model, an adaptive velocity motion model with adaptive noise **variance,** and an adaptive number of particles. The adaptive– velocity model is derived using a first–order linear predictor based on the appearance difference between the incoming observation and the previous particle configuration. **Occlusion** analysis is implemented using robust statistics. Experimental results on tracking visual objects in long outdoor and indoor video sequences demonstrate the effectiveness and robustness of our tracking algorithm. We then perform simultaneous tracking and recognition by embedding them in a particle filter. For recognition purposes, we model the appearance changes between frames and gallery images by constructing the intra– and extrapersonal spaces. Accurate recognition is achieved when confronted by pose and view variations.
Descriptors
ADAPTIVE–FILTERS; HIDDEN–FEATURE–REMOVAL; IMAGE–RECOGNITION; STATISTICAL–ANALYSIS; TRACKING.
Classification codes
B6135E Image–recognition*;
B6140B Filtering–methods–in–signal–processing;

B0240Z Other–topics–in–statistics;
C5260B Computer–vision–and–image–processing–techniques*;
C1140Z Other–topics–in–statistics.

Keywords

visual–tracking; visual–recognition; appearance–adaptive–model; first–order–linear–predictor; **adaptive–**noise–variance; **occlusion–**analysis; robust–statistics.

Treatment codes

P Practical;
T Theoretical–or–mathematical;
X Experimental.

Language

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Publication type

Journal–paper.

Availability

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Identification of occlusion regions based on background rebuilding for automatic video object segmentation.

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Conference information

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Sponsor(s): Nat. Lab. of Pattern Recognition, Inst. of Autom., Chinese Acad. of Sci; Huazhong Univ. of Sci. and Technol. (China).

Source

Proceedings of the SPIE – The International Society for Optical Engineering, {Proc–SPIE–Int–Soc–Opt–Eng–USA}, 2003, vol. 5286, no. 1, p. 883–6, 4 refs, CODEN: PSISDG, ISSN: 0277–786X. Publisher: SPIE–Int. Soc. Opt. Eng, USA.

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Abstract

In video sequences, object movement causes regions **occlusion** (to–be– covered or uncovered), which seriously decreases the accuracy of object segmentation. This paper presents a novel video object

segmentation algorithm that can identify the **occlusion** regions. The background rebuilding technique is used to construct a reliable background image from the accumulated frame difference information. The initial moving object segmentation is finished by the difference between the background image and the current frame, and the **occlusion** regions are detected. Then, the initial result is spatially segmented into homogeneous regions, and a method based on region labeling distinguishes between moving object and background regions. Experimental results for several MPEG–4 test sequences demonstrate the effectiveness of the proposed approach.

Descriptors

HIDDEN–FEATURE–REMOVAL; IMAGE–MOTION–ANALYSIS; IMAGE–SEGMENTATION; IMAGE–SEQUENCES; VIDEO–CODING.

Classification codes

B6135C Image–and–video–coding*;
B6135E Image–recognition;
C5260D Video–signal–processing*;
C5260B Computer–vision–and–image–processing–techniques;
C6130B Graphics–techniques.

Keywords

occlusion–regions–identification; background–rebuilding; automatic–video–object–segmentation; regions–labeling; video–sequences; reliable–background–image; accumulated–frame–difference–information; homogeneous–regions; MPEG–4–test–sequences; content–based–video–coding; motion–information; **noise–**variance; thresholding; temporal–information.

Treatment codes

X Experimental.

Language

English.

Publication type

Conference–paper; Journal–paper.

Availability

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Tracking occluded objects using partial observation.

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Acta Automatica Sinica, {Acta–Autom–Sin–China}, May 2003, vol. 29, no. 3, p. 370–80, 11 refs, CODEN: THHPAY, ISSN: 0254–4156. Publisher: Science Press, China.

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Abstract

This paper presents a framework for multi–object tracking from a single fixed camera. The potential objects to track are detected with intensity–plus–chromaticity mixture models. The region–based representations of each object are tracked and predicted using a Kalman filter. A scene model is created to help predict and interpret the occluded or exiting objects. Unlike the traditional blind tracking during **occlusion,** the object states are estimated using partial observations whenever available. The observability of each object depends on the predictive measurement of the object, the foreground region measurement, and the scene model. This makes the algorithm more robust in terms of both qualitative and quantitative criteria.

Descriptors

COMPUTER–VISION; **COVARIANCE–**MATRICES; GAUSSIAN–DISTRIBUTION; HIDDEN–FEATURE–REMOVAL; IMAGE–COLOUR–ANALYSIS; IMAGE–SEGMENTATION; IMAGE–SEQUENCES; KALMAN–FILTERS; OBSERVABILITY; TRACKING–FILTERS; VIDEO–SIGNAL–PROCESSING.

Classification codes

B6135E Image–recognition*;
B6140B Filtering–methods–in–signal–processing;
B0290H Linear–algebra–numerical–analysis;
B0240Z Other–topics–in–statistics;
C5260D Video–signal–processing*;
C5260B Computer–vision–and–image–processing–techniques;
C6130B Graphics–techniques;
C4140 Linear–algebra–numerical–analysis;
C1140Z Other–topics–in–statistics.

Keywords

multi–object–tracking; partial–observation; foreground–region; scene–model; single–fixed–camera; intensity–plus–chromaticity–mixture–models; region–based–representations; Kalman–filter; Gaussian–distributions; state–transition–matrix; **a–**posteriori–error–covariance; bounding–box; observability.

Treatment codes

X Experimental.

Language

English.

Publication type

Journal–paper.

Availability

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Search Strategy

No.	Database	Search term	Info added since	Results
1	INZZ	occlusion	unrestricted	6053
2	INZZ	variance OR covariance	unrestricted	67528
3	INZZ	1 AND 2	unrestricted	67

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